

Amendments to the Specification:

Please replace the first full paragraph on page 5 of the specification, which begins with "With these state" with the following amended paragraph:

With these state of the art in mind there is now provided, according to the present invention a process for the recovery of lactic acid from aqueous solutions containing at least one water-soluble lactate salt and having a pH of about between 4 and 14, comprising the steps of: (a) contacting said aqueous solution with a cation exchanger which is protonated, that is at least partially in its acid form, said cation exchanger being water immiscible in both acid and salt form, whereby ion exchange is effected, protons are transferred from said cation exchanger to the aqueous solution to acidulate it and to form lactic acid therein and cations from said aqueous solution are bound by said cation therein and cations from said aqueous solution are bound by said cation exchanger; said cations being derived from said lactate salt, (b) ~~reacting~~ regenerating said cations carrying cation exchanger to convert it into a cation exchanger which is at least partially in its acid form and to a second product is a basic ~~and comprises form of~~ the cation of said salt; and (c) recovering lactic acid from said lactic acid-containing acidulated aqueous solution by methods known per se.

Please replace the first full paragraph on page 7, which begins with "The salt form", with the following amended paragraph:

The salt form of the water-immiscible cation exchanger can readily be treated to convert it back to its acid form. This can be achieved by contact with a solution of an acid or an acidic salt, preferably one that is stronger than the cation exchanger. Operating this way consumes a strong acid and could therefore be considered as an indirect acidulation of the lactate salt via a water immiscible cation exchanger. Unlike in the case of direct acidulation by adding a water soluble acid, no salt is formed in the aqueous solution in the case of indirect acidulation and one can use the preferred amine base extractants for the recovery of the liberated acid. Yet an acid is consumed and a by-product salt is formed. There are various ways to split this by-product salt. For example, an acidic ammonium salt of a di- or triprotic acid, e.g.,  $\text{NH}_4\text{HSO}_4$ , could be used as the regenerant of the cation exchanger in an ammonium form. The resulting neutralized salt, namely ammonium sulfate, decomposes thermally to ammonia to be reused, and to ammonium bisulfate, which is the acidic salt, the acidulant. As long as the lactate is an ammonium lactate the regenerant could be  $\text{NaHSO}_4$  or any other acidic sulfate salt,  $\text{MHSO}_4$ , which is easy to work with. ~~A~~ An alkali metal M that forms  $\text{MNH}_4\text{SO}_4$  of relatively low solubility is preferable, as it lowers the energy costs related to water evaporation during the thermal decomposition of the salt.

Please replace the paragraph beginning at the bottom of page 7 of the specification, which starts with "In a preferred embodiment" with the following amended paragraph:

In a preferred embodiment the salt of the cation exchanger is decomposed to

reform the acid form and a second product which is a basic form of said cation of said lactate salt. An example is the case where the lactate salt is ammonium lactate and an ammonium salt of the water immiscible cation exchanger is formed. The latter can be decomposed thermally to the cation exchanger in its acid form and to ammonia. Conducting the thermal decomposition at sub-atmospheric conditions or by transfer of a carrier gas helps in shifting the reaction in the desired direction. Steam and CO<sub>2</sub> are among the suitable carrier gases. Compared to the possibility of decomposition of a salt formed on regenerating of the acid form of the cation exchanger by an aqueous solution of an acid, direct decomposition saves on energy consumption for water evaporation. In addition, for a liquid cation exchanger, the decomposition can be assisted by changing the medium/solvent of the salt prior to its decomposition. An alternative to distillation of the second product is the precipitation thereof. Thus, thermal hydrolysis of calcium salts of the cation exchanger forms calcium hydroxide, or if conducted in the presence of CO<sub>2</sub>, CaCO<sub>3</sub>. The crystallization energy of these compounds assists the salt decomposition.

Please replace the first full paragraph on page 8 of the specification, which starts with "In a further preferred embodiment the second product" with the following amended paragraph:

In a further preferred embodiment the second product is basic and can be reused as a neutralizing agent in fermentation. Thus, the lactate salt-containing aqueous solution could be a fermentation broth after removal of the biomass and

possibly also after some additional pretreatments. Alternatively, it could be a stream obtained on recovery of lactic acid from broth treated by other methods. If ammonia is used for pH adjustment in the fermentation (i.e. used as the neutralizing agent there), the lactate salt in the broth will be primarily ammonium lactate. Acidulation by water immiscible cation exchanger would convert the latter from its acid form to its ammonium salt. Thermal decomposition of that ammonium salt reforms the cation exchanger in its acid form and forms a second product, ammonia which is a basic form of the ammonium cation of ammonium lactate. In fact the neutralizing agent is regenerated and can be reused in the fermentation. Thereby, the process avoids the consumption of stoichiometric amounts of a neutralizing base and of an acidulant and the formation of a stoichiometric amount of a by-product salt. Examples for other basic, second decomposition products suitable for reuse in adjusting the pH in fermentation are calcium hydroxide or carbonate and sodium hydroxide, bicarbonate or carbonate resulting from applying the process to calcium lactate or sodium lactate-containing solutions respectively.